

**WEB BASED SECURE PRINTING SYSTEM**

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**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**BORANG PENGESAHAN STATUS TESIS \***

JUDUL: WEB-BASED SECURE PRINTING SYSTEM (WebSPS)

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# WEB BASED SECURE PRINTING SYSTEM

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This report is submitted in partial fulfillment of the requirements for the  
Bachelor of Computer Science (Computer Networking)


FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA  
2008


**DECLARATION**

I hereby declare that this project report entitled

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is written by me and is my own effort and that no part has been plagiarized  
without citations.

**STUDENT** :  Date: 23 JUNE 2008  
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## DEDICATION

I dedicate this thesis to the creator of all things, the source of knowledge and the giver of life that set us apart from the rest of His creation. I make no claims about the contents of this book originating from my research and findings. I dedicate this thesis to my beloved parents. Without their patience, understanding, support and most of all love, the completion of this work would not have been possible. I would also like to dedicate to the authors of the hundreds of books and research journals, without whom there would be nothing to support my words, I give you praise. I must also dedicate this thesis to my supervisors who have inspired and assisted me throughout this research. Finally, I dedicate my thesis to all my friends and to everyone who have directly or indirectly helped and supported me.

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## ABSTRACT

Web-based secure printing system (WebSPS) is a project of improvisation and enhancement over the current system implemented in UTeM Cyber Café which is computer based printing system. The system will authorize a user through an authentication mechanism before one may acquire access to the system. Security is the fundamental aspect to be established in this system as secure file upload and password security resides into it. The printing operation conducted by a user is based on coupon which is to be purchased from the administrator. Student may only be able to generate hardcopies based on the payment. The system will provide an easy and friendly way to print files in a web based environment. Basically the approach used is Object Oriented Software Development Life Cycle (OOSDLC) to make system elements more reusable, thus improving system quality and the productivity of systems analysis and design. The main language used to erect the system is PHP and HTML. The WebSPS system architecture is made of three-tier structure which is Client, application and Information tier. Administrator gain more privileges and access through the system. A number of software development tools has been used namely Dreamweaver, Apache, MySql and php.

## ABSTRAK

*Web-based secure printing system (WebSP)* adalah sebenarnya projek gubahan dan penambahbaikan ke atas sistem berkomputer yang dijalankan di Pusat Siber, UTeM pada masa ini. Sistem ini akan menghalalkan seseorang pelajar melalui sistem pengesahan kata laluan sebelum diberi kuasa ke dalam sistem. Keselamatan adalah perkara penting yang digariskan dalam projek ini sepertimana muat naik fail dengan selamat dan keselamatan kata laluan dilaksanakan dalam sistem ini. Sebarang proses pencetakan yang hendak dijalankan oleh seseorang pelajar adalah berdasarkan nilai kupon yang dibeli daripada pengurus Siber Kafe. Pelajar hanya dibenarkan menjana bilangan kertas cetakan berdasarkan nilai kupon. Sistem akan memudahkan dan menyenangkan pelajar untuk mencetak menggunakan aplikasi web. Untuk membangunkan sistem ini, pendekatan yang diguna pakai adalah *Object Oriented Software Development Life Cycle (OOSDLC)* untuk menjadikan sistem ini sesuatu yang boleh dipakai, meninggikan kualiti dan produktiviti analisis dan reka bentuk. Bahasa utama yang digunakan untuk mendirikan sistem ini adalah PHP dan HTML. Seni bina sistem WebSP ini merangkumi tiga lapis iaitu pelanggan, aplikasi dan maklumat. Pengurus menerima akses dan hak yang lebih tinggi menerusi sistem ini. Beberapa perisian digunakan untuk membangunkan sistem ini seperti Dreamweaver, Apache, MySql dan php.



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## LIST OF ABBREVIATIONS

ABBREVIATION	-	WORD/ DESCRIPTION
WebSPS	-	Web Based Secure printing System
PAC	-	Print Access Code
OOSDLC	-	Object Oriented Software Development Life Cycle
PC	-	Personal Computer
SSL	-	Secure Socket Layer
TCP	-	Transmission Control Protocol
IP	-	Internet Protocol
HTTP	-	HyperText Transfer Protocol
MAC	-	Media Access Control
IT	-	Internet Technology
WWW	-	World Wide Web
HTML	-	HyperText Markup Language
PHP	-	PHP: HyperText PreProcessor
ODBC	-	Open Database Connectivity
JDBC	-	Java Database Connectivity
UTP	-	Unshielded Twisted Pair
PSM	-	<i>Projek Sarjana Muda</i>
DFD	-	Data Flow Diagram
DBMS	-	Database Management System
RAM	-	Random Access Memory
ER	-	Entity Relationship

NF	-	Normal Form
dll	-	Dynamic Link Library
MD5	-	Message Digest algorithm
DES	-	Data Encryption Standard
ext	-	Extension
MIME	-	Multipurpose Internet Mail Extensions
MB	-	MegaByte
pswd	-	Password
doc	-	Document

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# CHAPTER I

## INTRODUCTION

### 1.1 Project Background

The Computer Centre of University Technical Malaysia Melaka was established since 2001 and started with only internet service at beginning while operating in Shop lots. Later it began to provide printing services to students using manual system where students need to go for the one computer which is allocated particularly for printing purpose. Students will have to pay after the printing is done. This was cumbersome and time consuming. After that the department started to implement computer based printing system. Using this system, all computers were connected to one network printer and all printing jobs were done here.

Later by early of 2007, a Coupon System was introduced where each student must purchase a coupon with an agreed payment and they can print a certain amount of hardcopies based on that payment. The number of printer was increased to two and each PC is fixed to one printer from the two available. First of all, student must log in to their respective student email. From the site, they are required to generate a printing code using PAC Request button which lasts for 3 minutes only. Then, they have to paste the code in windows document printing information to proceed with printing. However, we track out few lacking functions from this existing system in perspective of security.

In conjunction with above matter, a web based secure printing system (WebSPS) is to be developed. The project is developing a secure printing system for

the printing of documents over the web. The main feature of the system is that it allows a user to be authorized through an authentication mechanism before gaining access to print. The user then can print a certain number of hardcopies, based on an agreed payment. This system can be interpreted as a mechanism for providing pay-per-print service to control the number of hardcopies that a user can print. The security of the system resides in an aggregate of communication protocols and cryptographic algorithms. The system prevents eavesdropping so that people who intercept the communication cannot generate copies of the document. In this context, the to-be-print documents are encrypted to ensure secure delivering of material over the network.

The primary security policy to be designed in this system would be Authentication and Authorization mechanism. The aim is to identify and authenticate users before gaining access to the system and verifying their user level. This is done by requiring the user to enter a combination of Matric ID and password in order to be authorized. Except for a successful combination, one may not be able to enter the system. In addition, to change the current password user must comply with the password security meter. Incidentally, for newly registered users, their account is initialized using random password generator. The second security line used is password encryption. Password stored in database, cannot be read in plain text but rather encrypted in cipher text. Algorithm used to encrypt is MD 5 and Triple DES. The next approach is to implement a secure file upload to protect the document delivery all the way from client to server. One reason that we design secure file upload script with PHP is to prevent an attacker to upload malicious file or use an intercepting proxy to modify the submitted data to his liking.

As the printing of a particular document proceeds, the progress is monitored and this triggers the payment process and billing process according to the printing quota. The secure printing system is beneficial in many ways particularly for our target users; administrator and student. The administrator may have additional privileges compared to normal users. One of the ultimate considerations of such system is the pervasive security measures that protect the documents from unauthorized use. For the completion of this system, knowledge in communication protocol and internet security is applied.

## 1.2 Problem Statements

Following is a list of problems occurring in current printing system analyzed from a questionnaire (Refer Appendix A) conducted among a population of UTeM Cyber Café user communities.

- i. Inefficient technique of printing system where it requires student to generate a printing code (PAC) from their web mail and then copying it in windows printing document information. It takes two different platforms to handle printing process. All these have to be done in 3 minutes before the code expires, otherwise they will have to repeat from the start.
- ii. Insecure uploading of printing documents from client to server. A malicious user may upload a malicious file such as PHP Shell and execute arbitrary commands with the of the web server process. Providing file upload function without opening security holes proved to be challenge in web applications. There have been many applications suffered from ranging from arbitrary file disclosure to remote arbitrary code execution.
- iii. Students have to pay the amount of printing after all printing is done. In case if students have additional printings to do on the same day, then they will have to pay again. This gets worse when students have to wait in queue to settle their payment as well as to rush for their classes.

## 1.3 Objectives

- i. To develop a web based system that enables users to print document through the system remotely from any networked PC to the network printer.
- ii. To implement secure document delivery from client to server using Secure File Upload, Authorization and Authentication mechanism and Password Security.
- iii. To provide a printing quota system that can manage user's account and printing quota where a user can only print a certain number of hardcopies based on agreed payment.

## 1.4 Scopes

- i. The target users of system are students who use Computer Centre service to print documents. It is only for UTeM internal use.
- ii. The users must log on to the system using Matrix ID and Password to allow them authorized through an authentication mechanism.
- iii. Printing can be done via any printer connected with the server.
- iv. A secure upload of single file from client to server.
- v. The system is able to update and manage user's account system according to the printing quota system.
- vi. The system implements secure file uploading rules so that malicious files cannot be uploaded.
- vii. Area of study or boundary is UTeM Computer Centre and implementation is done in Local Area Network.
- viii. A secure web based system for the printing of Documents is implemented in UTeM Computer Centre.
- ix. Network Operating System runs on either Microsoft Windows XP or Microsoft Vista platform.

## 1.5 Project Significance

For the past few years, we find that printing system in UTeM is growing at constant. The web based secure system in UTeM is important in such way to pervade security elements in the distributed printing. Users should be identified either as student or as administrator before obtaining access to the system. This is crucial to ensure that the facility provided by University is fully utilized for student's affair. Other than that, it is also to make users aware of their rights as consumers, as well as the existence of the secure printing and the services available. Each user are deserved to have safe and protected document printing. With execution of this system the organization will be able to protect security policies, thereby eliminates any violation of rules fixed by the Computer Centre.

## 1.6 Expected Outputs

The compliance of WebSPS in UTeM Computer Centre is expected to produce the following outputs:

- i. User can be identified and authorized before they can perform any tasks and has agreed to a certain amount of payment to print hardcopies.
- ii. Maximum login attempts are three. Beyond that, IP of the PS will be blocked.
- iii. User is able to print documents through a printer attached to the server.
- iv. Printing documents can be uploaded from client to server and stored in server.
- v. User's account is manageable according to the printing quota system.
- vi. A secure web based application embedded with security features resides in an aggregate of secure file upload, login attempts and password security.
- vii. Password is stored in a ciphered text form instead of original plain text.
- viii. Password can be changed only if complied with the password strength meter.
- ix. User cannot upload other than the allowed file types.
- x. Initial password is set by the system and sent to student's respective email.

## 1.7 Conclusion

In a whole, the system focuses on designing security features to the printing process in UTeM Computer Centre using a web based application. The system comprises of authentication and authorization mechanism for verifying user. The second line of security measure would be Password Encryption to convert password into ciphered text and store into database. Secure File Upload as the third line protection intended to protect uploading of files to server. Users account is managed according to the printing quota system where each user is permitted to generate only a certain amount of hardcopies.

Henceforward, literature review and project methodology will be discussed in the next chapter. This chapter will review on previous systems and draw a comparison with the proposed system. It will also discuss on techniques used, project methodology and project requirements involved in this project.